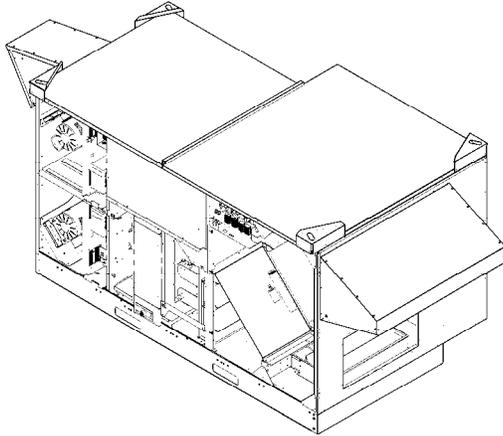


RD2XRT INSTALLATION AND OPERATION MANUAL

BOOK 4

ELECTRICAL



ABOUT BOOK 4:

This book covers the basic electrical installation of the RD2XRT.

Please see Book 1 for an overview of the RD2X and system design considerations.

See Book 2 for product and performance specifications.

See Book 3 for the mechanical installation of the RD2X.

See Book 5 for control system connections, VFD adjustment, Start-Up, Commissioning or Maintenance.

This book does not cover overall system design or system integration issues. Some of these issues are discussed in Books 1 and 5, but in general, specification documents provided by a qualified specifying engineer are to be considered the Basis of System Design.

Following these instructions does not necessarily assure compliance with local codes and standards, which must always be observed.

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BOOK 4: ELECTRICAL

PRODUCT FEATURES

The RD2X is an Energy Recovery Ventilator with available features designed for Dedicated Outdoor Air Systems.

Standard features include:

- Energy recovery by fixed-plate enthalpic energy exchanger
- Enthalpy- and temperature-controlled bypass of energy recovery
- Isolation dampers that shut down when ventilation is not needed
- Variable-Frequency Drive (VFD)-controlled direct-drive fresh air and exhaust air blowers
- Integrated disconnect switch
- Airflow measurement stations

Available features include:

- Heating and/or cooling coils for post-treatment of fresh air
- Double-wall construction

PRINCIPLE OF OPERATION

The RD2X can operate in up to four modes depending on options installed:

- Energy Recovery mode: the unit transfers heating or cooling energy from the exhaust air to the fresh air.
- Recovery Bypass mode: the unit takes advantage of free cooling from the outside air and doesn't transfer energy between air streams.
- Dehumidification mode: the unit conditions the fresh air to 53°F.
- Heating mode: the unit tempers the fresh air to 75°F.

The RD2X operates automatically. The unit receives an external call for ventilation. Its isolation dampers open and turn on the variable frequency drives and blowers. The unit determines the operating mode by continuously monitoring the air streams for temperature and enthalpy.

The RD2X does not include a condensing unit, chiller, heat pump or boiler. When a coil for dehumidification or cooling is part of the RD2X unit, the condensing unit, chiller, heat pump or boiler is separately installed to meet the needs of the complete system. RD2X units equipped with coils include connection points to call for operation of the separate heating or cooling equipment. **However, no fluid or refrigerant flow control valve (TX valve) is provided, and must be specified by the designer of the overall system for separate sourcing.**

OPERATING CONTROLS

A wide variety of low voltage (24VAC) control schemes may be selected to meet the ventilation needs of the facility. These may include time clock, occupancy sensor, carbon dioxide sensor, and others. DDC systems may also control the unit with external control by other. **TX valves are not provided.**

WARNING

RISK OF FIRE, ELECTRIC SHOCK, OR INJURY.

OBSERVE ALL CODES AND THE FOLLOWING:

1. Before servicing or cleaning the unit, switch power off at disconnect switch or service panel and lock-out/tag-out to prevent power from being switched on accidentally. More than one disconnect switch may be required to de-energize the equipment for servicing.
2. This installation manual shows the suggested installation method. Additional measures may be required by local codes and standards.
3. Installation work and electrical wiring must be done by qualified professional(s) in accordance with all applicable codes, standards and licensing requirements.
4. Any structural alterations necessary for installation must comply with all applicable building, health, and safety code requirements.
5. This unit must be grounded.
6. Sufficient air is needed for proper combustion and exhausting of gases through the flue (chimney) of fuel burning equipment that might be installed in the area affected by this equipment. If this unit is exhausting air from a space in which chimney-vented fuel burning equipment is located, take steps to assure that combustion air supply is not affected. Follow the heating equipment manufacturer's requirements and the combustion air supply requirements of applicable codes and standards.
7. Use the unit only in the manner intended by the manufacturer. If you have questions, contact the manufacturer.
8. This unit is intended for general ventilating only. Do not use to exhaust hazardous or explosive materials and vapors. Do not connect this unit to range hoods, fume hoods or collection systems for toxics.
9. When cutting or drilling into wall or ceiling, do not damage electrical wiring and other hidden utilities.
10. If installed indoors this unit must be properly ducted to the outdoors.

CAUTION

To avoid motor bearing damage and noisy and/or unbalanced impellers, keep drywall spray, construction dust etc, out of unit.

BOOK 4: ELECTRICAL

POWER CONNECTIONS

All internal electrical components have been wired at the factory. It is only necessary to bring supply voltage, control wires, and wires to external equipment supplied by others to the unit.

Determine the voltage of the power supply for the unit. Before bringing power to the unit check unit nameplate to confirm it matches the voltage and phase of the power being supplied. Use conduit, strain reliefs, etc. as required by code to secure the field wiring. Field connections need to be accessible for inspection.

WARNING

Follow all applicable safety codes, such as NEC or CSA C22.1 Canadian Electric Code part 1!

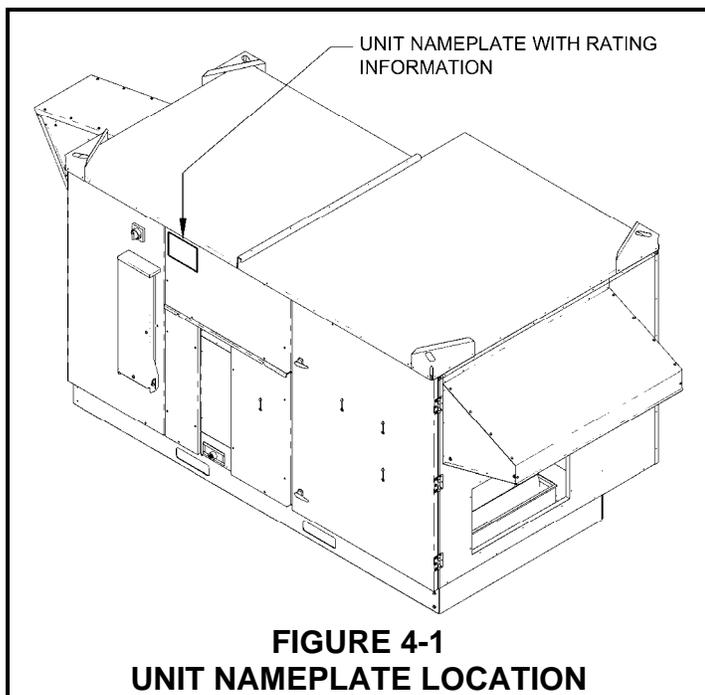
MINIMUM SUPPLY WIRE RATINGS

WIRE SIZING:

Use Minimum Circuit Ampacity (MCA) rating on the Unit Nameplate as the basis for wiring sizing.

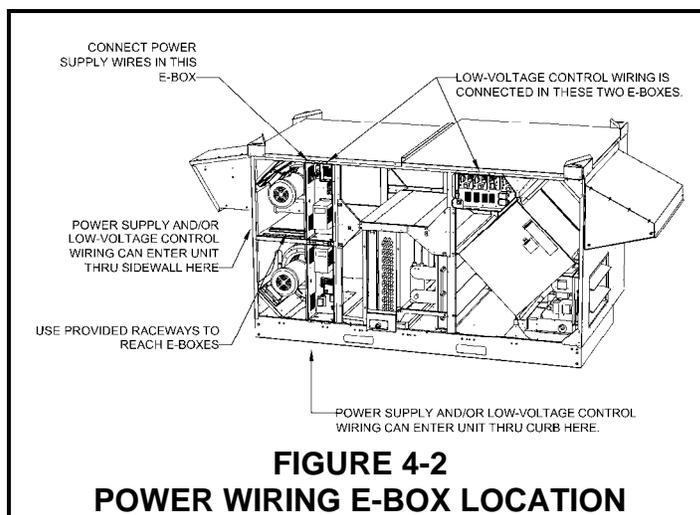
Wire insulation must have minimum 75°C rating.

Wire insulation must have minimum 600V rating.



WARNING

Installation work and electrical wiring must be done by qualified professional(s) in accordance with all applicable codes, standards, and licensing requirements.



CONNECT POWER SUPPLY WIRING TO LOAD SWITCH HERE

LOW-VOLTAGE CONTROL TERMINALS

**FIGURE 4-3
POWER WIRING TERMINALS
(wires not shown for clarity)**

WARNING

Re-install the finger-safe guard after connecting the power supply conductors to the L1, L2 & L3 on the Disconnect Switch.

See next page for information on wire routing to the electrical enclosures.

BOOK 4: ELECTRICAL

POWER CONNECTIONS

Power and control wiring can enter the unit from either:

- Hole(s) drilled through the bottom of the unit (Fig. 4-5);
- or
- Hole(s) drilled through the side of the unit (Fig 4-6).

Separate wiring raceways are provided in the unit blower compartment to rout control and power wire to the top of the electrical enclosures.

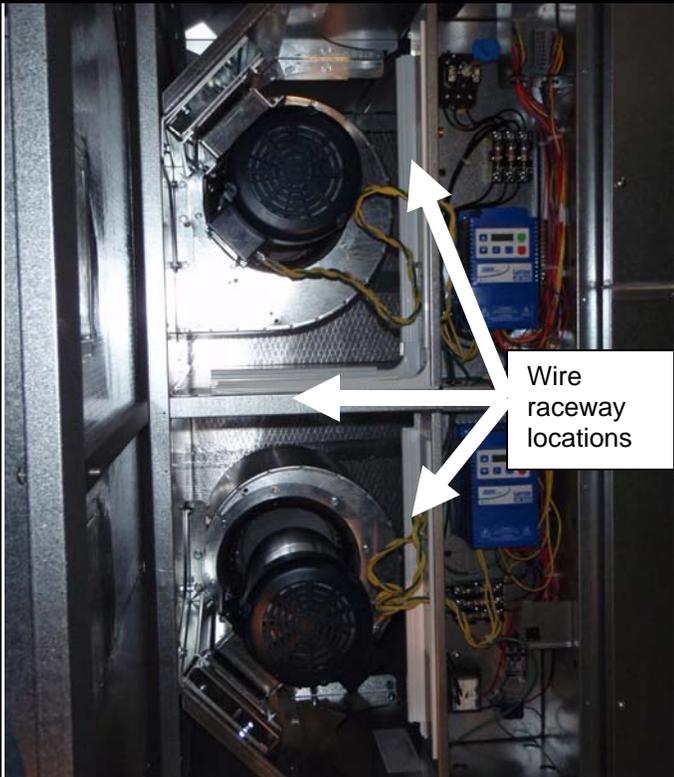


FIGURE 4-4
WIRING RACEWAY LOCATIONS IN BLOWER COMPARTMENT

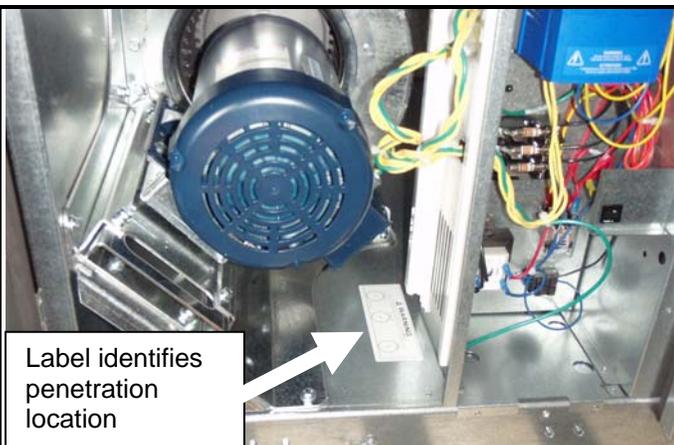


FIGURE 4-5
WIRE ENTRY THROUGH BASE OF UNIT



FIGURE 4-6
WIRE ENTRY THROUGH OUTLET SIDE OF UNIT

Power wiring should be routed from the top of the smaller raceway through the opening in the top of the high-voltage electrical box (Fig 4-7). Connect power wiring to the upper terminals of the disconnect switch. Re-install the finger-safe guard after connecting the power wiring.

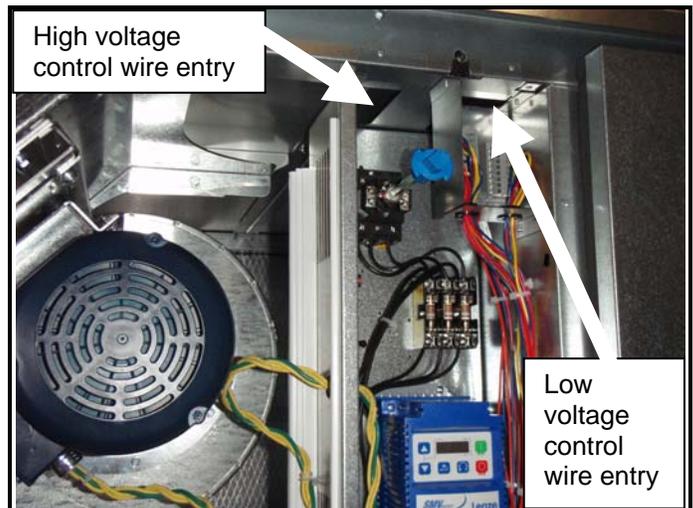


FIGURE 4-7
WIRE ENTRY INTO UPPER E-BOX

Low-voltage control wiring should be routed from the top of the larger raceway through the opening in the top of the low-voltage terminal enclosure (Fig 4-7).

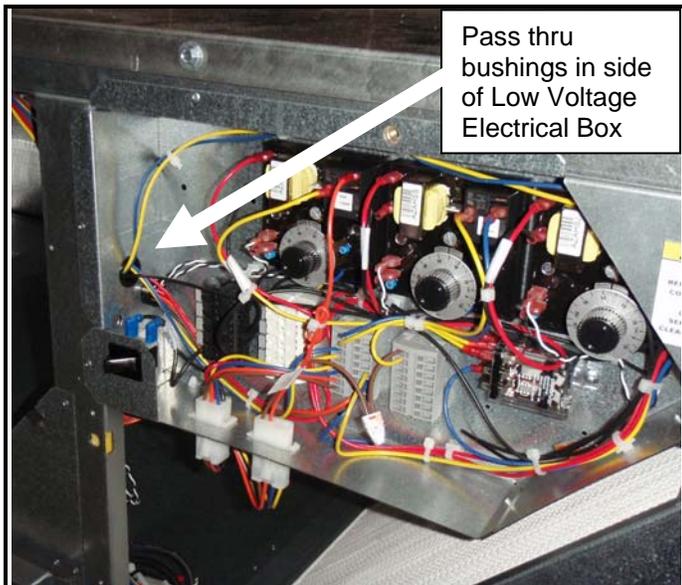
BOOK 4: ELECTRICAL

DISCONNECT SWITCH RATINGS



White channel
at top of
center section

FIGURE 4-9
ROUTING CONTROL WIRES TO LOW-VOLTAGE E-BOX



Pass thru
bushings in side
of Low Voltage
Electrical Box

FIGURE 4-10
WIRE ENTRY INTO LOW-VOLTAGE E-BOX

DISCONNECT SWITCH RATINGS

RD2X unit has an integrated Disconnect Switch with a door interlock. The door covering the high-voltage and motor compartments cannot be opened without turning this Disconnect Switch to the "OFF" position.

Once the door is opened, the Disconnect Switch can be switched back to the "ON" position for trouble-shooting purposes.

Local codes may require installation of an additional Disconnect Switch.

RATINGS:	1Ø	3Ø
VOLTAGE:	600VAC	
AMPS:	40A	25A
HORSE POWER:	4HP @ 240V	7.5HP @ 240V
MAXIMUM WIRE SIZE:	6AWG	8AWG

CHARACTERISTICS:

- Must be in OFF position to open Door covering high-voltage compartments.
- May be returned to ON position after Door is open.
- Must be in OFF position to close Door.
- Available Factory Option: Fuse Block
- Door covering low-voltage electrical compartment can be opened without turning disconnect switch to OFF position.
- When Disconnect Switch is in OFF position, voltage is still available at the L1, L2 and L3 terminals.

⚠ WARNING

Danger of Electrical Shock when servicing unit. ALWAYS DISCONNECT POWER SOURCE BEFORE SERVICING! More than one disconnect switch may be required. Proper wiring size selection and wiring installation are the responsibility of the electrical contractor.

⚠ WARNING

Danger of Electrical Shock! Variable Frequency Drive capacitors retain charge after power is removed. Disconnect power and wait a minimum of three minutes before servicing drive.

Do not cycle input power to drive more than once every two minutes.

BOOK 4: ELECTRICAL

ON-BOARD TRANSFORMER

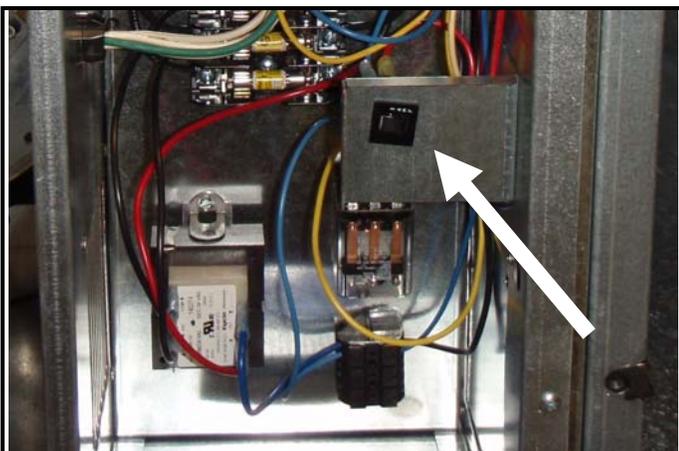
The RD2X has an on-board transformer that provides a high-quality source of 24VAC Class 2 power source for low-voltage control systems. The transformer itself is designed to fail safely in the event of a catastrophic overload. In addition, a re-settable circuit-breaker protects the transformer from inadvertent short-circuits that could occur during connection of the low-voltage wiring. If an excessive load is placed on the transformer the circuit breaker will trip to prevent the failure of the transformer. When it trips the circuit breaker's button pops up, exposing a white mark. Shut off the primary-side power to the unit, and remove the excessive load or the short. The circuit breaker can be reset about fifteen seconds after it trips by pressing in the button.

CAUTION

UNITS WITH 230VAC POWER SUPPLY:

Unit is shipped with transformer set for 208VAC power supply. For 230VAC, move the black primary-side lead from the transformer's "208V" terminal to the transformer's "230V" terminal.

Do not move the black primary-side lead that is connected to the transformer's "COM" terminal.



**FIGURE 4-8
CIRCUIT BREAKER LOCATION IN BOTTOM
E-BOX.**

Limits of Power Output

If limits on wire gauge and length are observed, you may connect control devices that draw up to 8VA. More than one device can be connected as long as total steady-state load does not exceed 8VA.

Observe these limits to wire length and gauge in order to ensure reliable operation of the control system.

Wire Gauge	#22	#20	#18	#16	#14	#12
Circuit Length	40'	60'	100'	150'	250'	400'

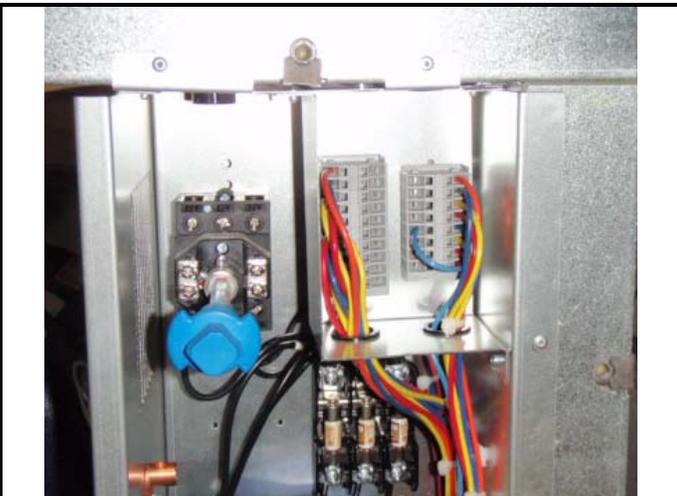
"Circuit Length" is distance from RD2X to Control Device

BOOK 4: ELECTRICAL

CONTROL CONNECTIONS

The RD2X can be controlled by various devices including remote switch or relay, digital time clock with relay, occupancy sensor with relay, and carbon dioxide sensor with relay and analog output. These devices are commonly known as 2-wire, 3-wire, and 4-wire devices.

A terminal block in the low-voltage compartment in the RD2X **blower** section allows for connection of any control device. See the section on External Control Diagrams for connection of various control devices.



**FIGURE 4-11
TERMINAL BLOCKS FOR CONTROL
DEVICE CONNECTION.**

⚠ WARNING

Danger of Electrical Shock when servicing unit. ALWAYS DISCONNECT POWER SOURCE BEFORE SERVICING! More than one disconnect switch may be required. Proper wiring size selection and wiring installation are the responsibility of the electrical contractor.

⚠ WARNING

Installation work and electrical wiring must be done by qualified professional(s) in accordance with all applicable codes, standards, and licensing requirements.

BASIC UNIT CONTROL CONNECTIONS

2-wire controls: If the control requires no power to operate and acts like a simple on/off switch, use the red and yellow wires. Make no connection to the blue wire.

3-wire controls: If the control requires 24VAC power to operate, and has a third connection point (output) that goes hot when the control is calling for operation, connect the red and blue wires to the power inputs of the control, and connect the yellow wire to the output of the control. If the unit does not turn on when the control calls, reverse the red and blue wires.

4-wire controls: If the control requires 24VAC power to operate, and has third and fourth non-powered connection points (dry contacts) that make a circuit when the control is calling for operation, connect the red and blue wires to the power inputs of the control. Connect the yellow wire to one of the dry contacts, and install a jumper between the red wire and the other dry contact.

EXTERNAL EQUIPMENT CONNECTIONS

The RD2X provides “dry contact” connections to signal external equipment supplied by others. These signals include indication of Recovery Bypass mode, Dehumidification mode, Heating mode, and Filter Alarm (dependent on options chosen).

Terminal blocks in the low-voltage compartment in the RD2X **core** section allows for these connections. See the section on Electrical Schematics for connection of these various signals.

The “dry contact” connection is provided through a relay rated 10A at 277VAC on the temperature controller.

See Figures 4-9 and 4-10 (page 6) for routing the wiring to external equipment.

ADVANCED OPERATING CONTROLS

A wide variety of low voltage (24VAC) control schemes may be selected by the engineer, installer, or owner to meet the ventilation needs of the facility. These may include time clock, occupancy sensor, carbon dioxide sensor, and others. DDC systems may also control the unit with external control by other. Most control schemes will operate the unit only when needed.

For additional details about advanced operating controls, see:

- **BOOK 2 – SPECIFICATIONS, pages 20-21,**
- **BOOK 5 – START-UP, COMMISSIONING AND MAINTENANCE, pages 11-37.**

BOOK 4: ELECTRICAL

ELECTRICAL INSTALLATION CHECKLISTS

PRE-START CHECKLIST

1. Turn the Disconnect Switch on the blower module to the "OFF" position and open the blower module door.
2. Verify the supply wire to the unit is the correct gage.
3. Verify the control wire to the unit is the correct gage.
4. In the blower module, check for obstructions in the blowers. Remove any foreign objects.
5. Rotate the blower wheels. They should rotate freely. Check for rubbing.
6. Check the blower wheels are secure on the motor shaft.
7. Open the core module door.
8. In the core module, check for obstructions to the dampers. Remove any foreign objects.
9. Close all doors.
10. Check that the unit is level.

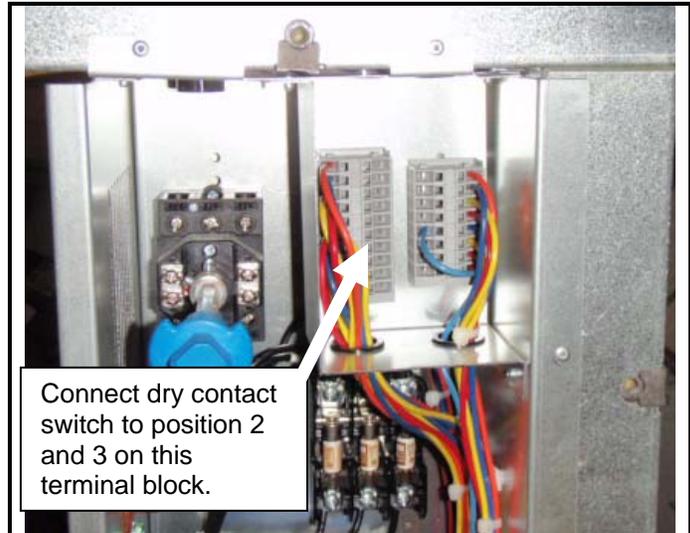


FIGURE 4-12
CONNECTION OF TEST SWITCH

BASIC UNIT OPERATION CHECK

The RD2X unit can be connected to various devices that provide an external call for ventilation (see CONTROL CONNECTIONS, page 7). The Basic Unit Operation Check should be performed BEFORE connecting controls.

1. For the Basic Unit Operation Check install a test switch Terminals 2 (C) and 3 (NC) on the **left** terminal block in the top electrical box of the blower module. Install the test switch outside of the unit and close all doors. Disconnect any external controls.
2. With the test switch in the "off" or "open" position, apply power to the unit. Remove the inverter covers in the blower door. The VFD displays should be lit. The unit should not operate.
3. Change Parameter 140 (P140) to 12 on the top (EA) VFD. This enables the relay output of the VFD. See section "TO CHANGE VFD PARAMETER P140" on the next page to change P140.
4. Close the test switch. The VFDs/motors/blowers should not turn on immediately. The isolation dampers are opening inside the unit. It will take less than 60 seconds for the dampers to open. Once they open the VFDs will automatically turn on. This is indicated by the blowers starting and the VFD displays showing increasing hertz.
5. Within 10 seconds the motors should be at factory-preset speed (typically 45 hertz).

(Continued next page)

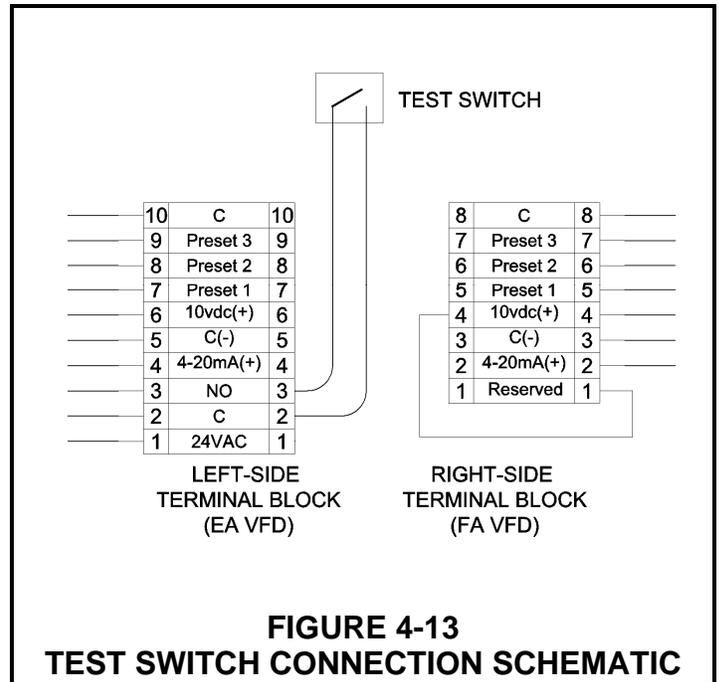


FIGURE 4-13
TEST SWITCH CONNECTION SCHEMATIC

WARNING

Danger of Electrical Shock when servicing unit. ALWAYS DISCONNECT POWER SOURCE BEFORE SERVICING! More than one disconnect switch may be required. Proper wiring size selection and wiring installation are the responsibility of the electrical contractor.

BOOK 4: ELECTRICAL

ELECTRICAL INSTALLATION CHECKLISTS

BASIC UNIT OPERATION CHECK (cont.)

6. With the unit operating at the factory-preset speed, and doors closed, check the operating voltage and amperage at each VFD (see TO VIEW VFD VOLTS AND AMPS, this page).
7. Confirm that each VFD is operating within the voltage and amperage range indicated for the motor it controls (see Unit Nameplate).
8. Take corrective action if necessary. If motor voltage is correct, but current is too high, reduce the VFD speed setting (see TO CHANGE VFD SPEED, below).
9. Turn off the test switch, and disconnect power to the unit.
10. Open door and remove the test switch. Close door.

WARNING

Danger of Electrical Shock! Door-mounted Disconnect Switch interrupts power to the unit when in the OFF position, but line voltage is still present at the L1, L2 & L3 terminals of the load switch. These terminals are covered by a finger-safe guard. MAKE SURE THE FINGER-SAFE GUARD IS IN PLACE!

TO CHANGE VFD PARAMETER P140

Note: This is only required on the EA VFD (top VFD).

1. VFD must be powered up – something will be showing on the LED display.
2. Push the “M” or MODE button – PASS will flash on screen followed by “0000”.
3. Press and hold UP Arrow to scroll to password 225.
4. Press MODE to display P100.
5. Use UP Arrow to scroll to parameter P140.
6. Press MODE to display Parameter value.
7. Use UP Arrow to change parameter value to 12.
8. Press MODE to display STOP (in some cases the display will be different).

TO VIEW VFD VOLTS

1. VFD must be powered up – something will be showing on the LED display.
2. Push the “M” or MODE button – PASS will flash on screen followed by “0000”.
3. Push MODE button again to display P500 (displayed parameter may vary).
4. Use UP or DOWN arrows to scroll to Parameter P506 (Motor Voltage).
5. Press MODE button to view the Motor Voltage.
6. Press MODE to exit.

TO VIEW VFD AMPS

1. VFD must be powered up – something will be showing on the LED display.
2. Push the “M” or MODE button – PASS will flash on screen followed by “0000”.
3. Push MODE button again to display P500 (displayed parameter may vary).
4. Use UP or DOWN arrows to scroll to Parameter P508 (Motor Current).
5. Press MODE button to view the Motor Current.
6. Press MODE to exit.

TO CHANGE VFD SPEED

1. VFD must be powered up – something will be showing on the LED display.
2. If speed is not displayed, push the “M” or MODE button until speed is displayed in hertz: for example, “60.0”.
3. Press the UP or DOWN arrows to change the operating speed.

TO RESET VFD PARAMETERS TO FACTORY SETTING USING KEYPAD

1. VFD must be powered up – something will be showing on the LED display.
2. Push the “M” or MODE button – PASS will flash on screen followed by “0000”.
3. Press and hold Up Arrow to scroll to password 1234
4. Press MODE to display P100
5. Use Up Arrow to scroll to Parameter 199
6. Press Mode again to display 00
7. Use up button to reach 02
8. Press MODE button to display STOP (in some cases the display will be different).
9. Turn VFD power off, wait thirty seconds, then turn VFD back on.

WARNING

Danger of Electrical Shock! Variable Frequency Drive capacitors retain charge after power is removed. Disconnect power and wait a minimum of three minutes before servicing drive.

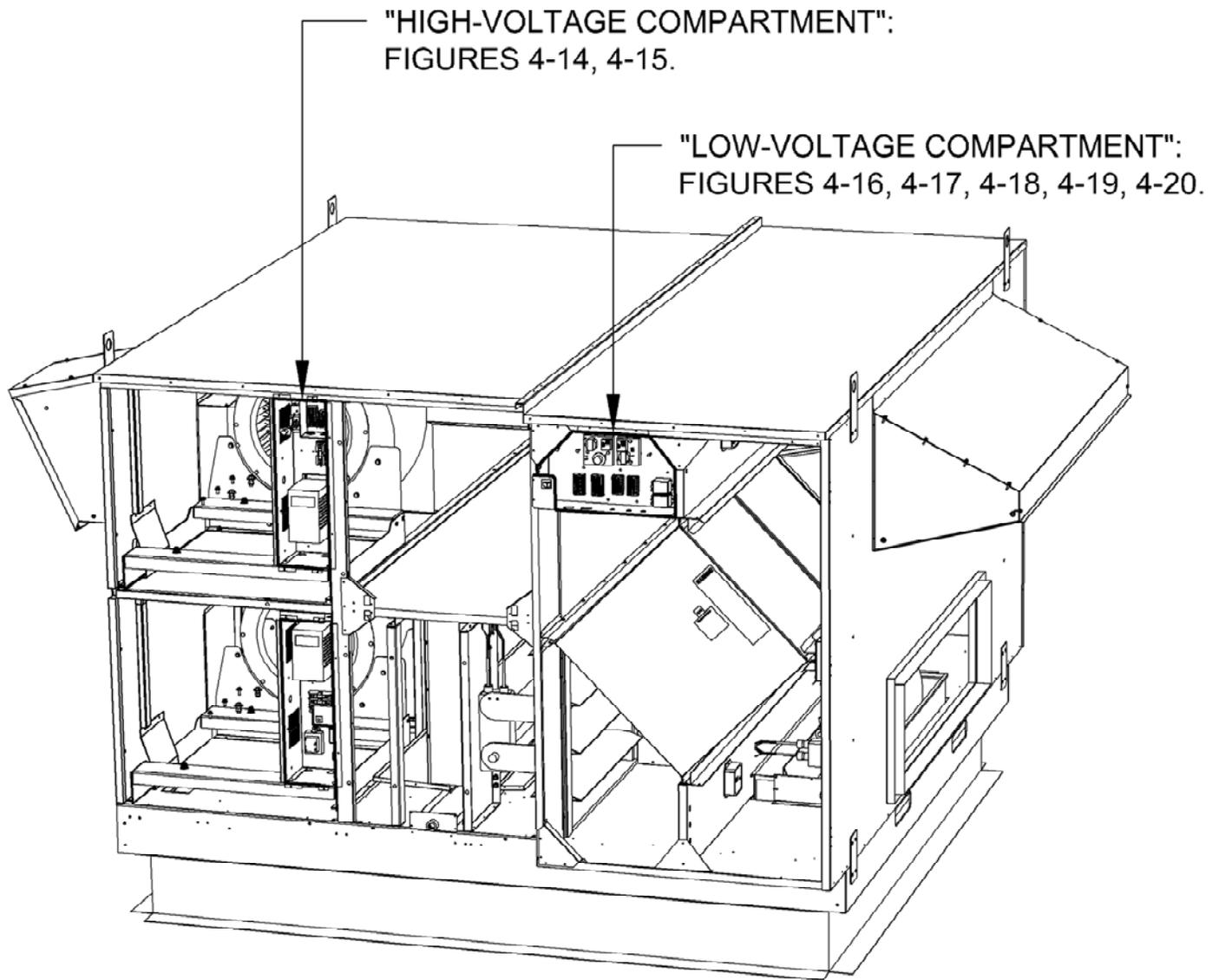
Do not cycle input power to drive more than once every two minutes

BOOK 4: ELECTRICAL

SCHEMATICS

FIGURE 4-14: KEY TO SCHEMATIC LOCATIONS.

APPLIES TO: All RD2XRT Units.

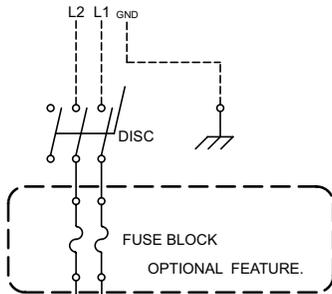


BOOK 4: ELECTRICAL SCHEMATICS

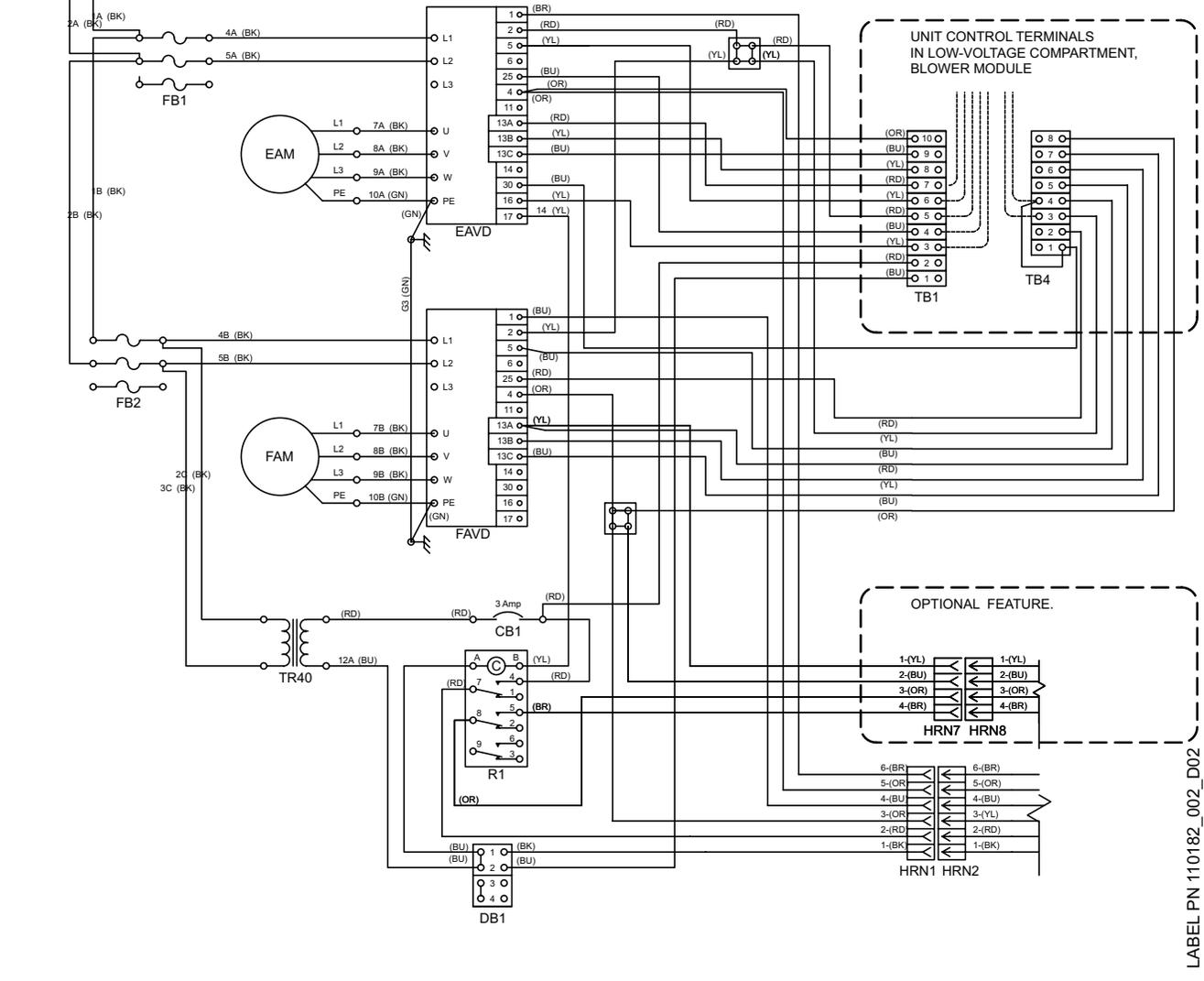
FIGURE 4-15. SINGLE-PHASE HIGH VOLTAGE COMPARTMENT.

HIGH VOLTAGE WIRING RD SINGLE PHASE UNIT

INPUT POWER
208-230 1



Color		Legend	
BK	Black	CB1	Circuit Breaker
BR	Brown	DB	Wire Connector
BU	Blue	DISC	2P Disconnect
GN	Green	EAM	Exhaust Air Motor
OR	Orange	EAVD	Exhaust Air VFD
RD	Red	FAM	Fresh Air Motor
YL	Yellow	FAVD	Fresh Air VFD
WH	WHITE	FB1,2	3P Fuse Blocks (2 poles used)
		HRN_	Plug Connected Wire Harness
		R_	3PDT Relay
		TB_	Terminal Block
		TR40	Control Voltage Transformer



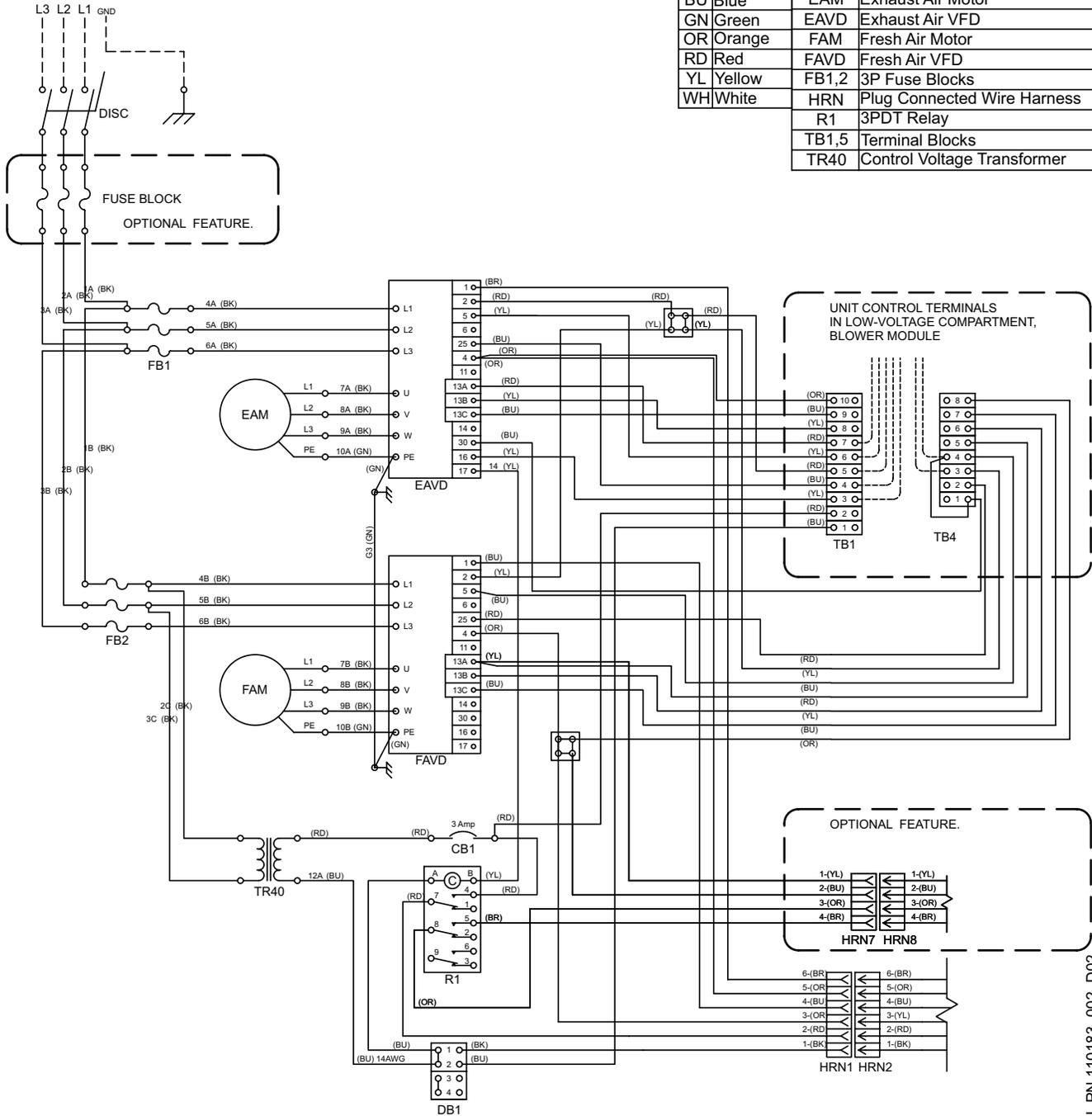
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BOOK 4: ELECTRICAL SCHEMATICS

FIGURE 4-16. THREE-PHASE HIGH VOLTAGE COMPARTMENT.

HIGH VOLTAGE WIRING RD THREE PHASE UNIT

INPUT POWER
208-230/460/575 3
DEPENDING ON UNIT
CONFIGURATION



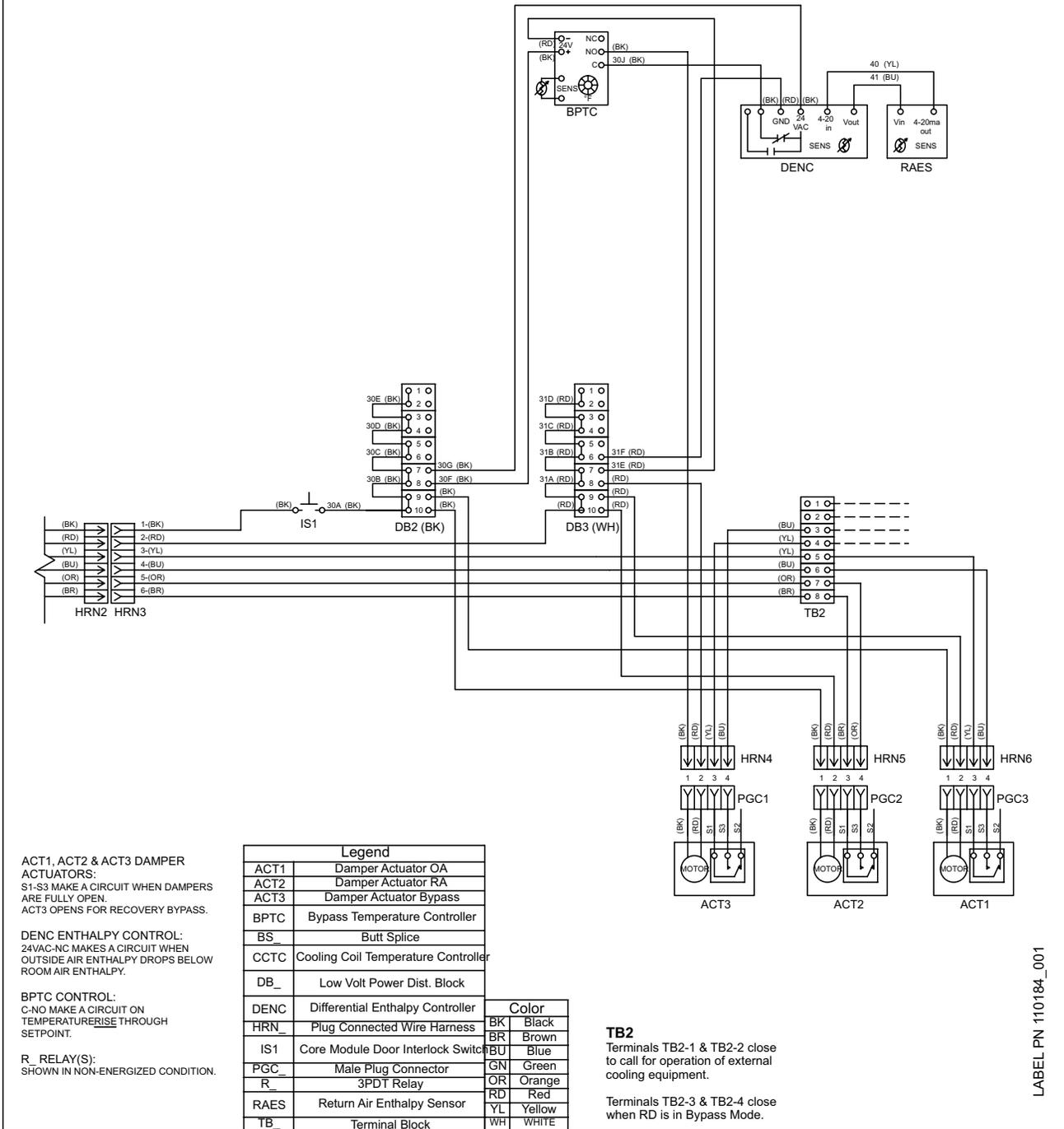
Color Legend		Legend	
BK	Black	CB1	Circuit Breaker
BR	Brown	DB	Wire Connector
BU	Blue	DISC	3P Disconnect
GN	Green	EAM	Exhaust Air Motor
OR	Orange	EAVD	Exhaust Air VFD
RD	Red	FAM	Fresh Air Motor
YL	Yellow	FAVD	Fresh Air VFD
WH	White	FB1,2	3P Fuse Blocks
		HRN	Plug Connected Wire Harness
		R1	3PDT Relay
		TB1,5	Terminal Blocks
		TR40	Control Voltage Transformer

LABEL PN 110183_002_D02

BOOK 4: ELECTRICAL SCHEMATICS

FIGURE 4-17. LOW VOLTAGE COMPARTMENT – BASIC UNITS.

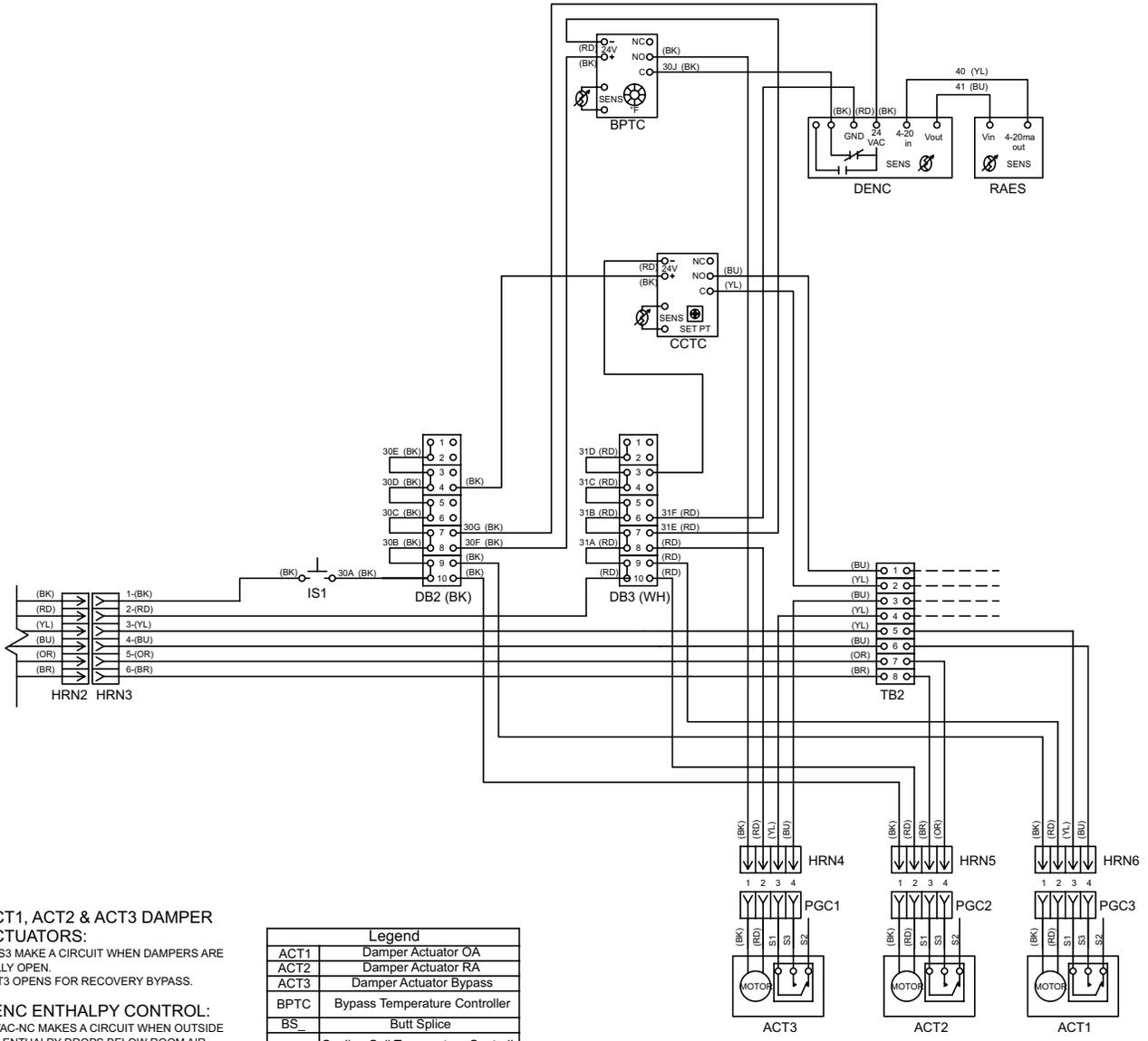
LOW VOLTAGE WIRING RD UNITS WITH NO HEATING OR COOLING COILS



BOOK 4: ELECTRICAL SCHEMATICS

FIGURE 4-18. LOW VOLTAGE COMPARTMENT – DEHUMIDIFICATION UNITS.

LOW VOLTAGE WIRING RD UNITS WITH DEHUMIDIFICATION COILS



ACT1, ACT2 & ACT3 DAMPER ACTUATORS:

S1-S3 MAKE A CIRCUIT WHEN DAMPERS ARE FULLY OPEN.
ACT3 OPENS FOR RECOVERY BYPASS.

DENC ENTHALPY CONTROL:

24VAC-NC MAKES A CIRCUIT WHEN OUTSIDE AIR ENTHALPY DROPS BELOW ROOM AIR ENTHALPY.

BPTC CONTROL:

C-NO MAKE A CIRCUIT ON TEMPERATURE RISE THROUGH SETPOINT.

R_ RELAY(S):

SHOWN IN NON-ENERGIZED CONDITION.

CCTC CONTROL:

C-NO MAKE A CIRCUIT ON TEMPERATURE (ALTERNATE DEWPOINT) RISE THROUGH SETPOINT

Legend		
ACT1	Damper Actuator OA	
ACT2	Damper Actuator RA	
ACT3	Damper Actuator Bypass	
BPTC	Bypass Temperature Controller	
BS	Butt Splice	
CCTC	Cooling Coil Temperature Controller	
DB_	Low Volt Power Dist. Block	
DENC	Differential Enthalpy Controller	Color
HRN_	Plug Connected Wire Harness	BK Black
IS1	Core Module Door Interlock Switch	BR Brown
PGC_	Male Plug Connector	BU Blue
R_	3PDT Relay	GN Green
RAES	Return Air Enthalpy Sensor	OR Orange
TB_	Terminal Block	RD Red
		YL Yellow
		WH White

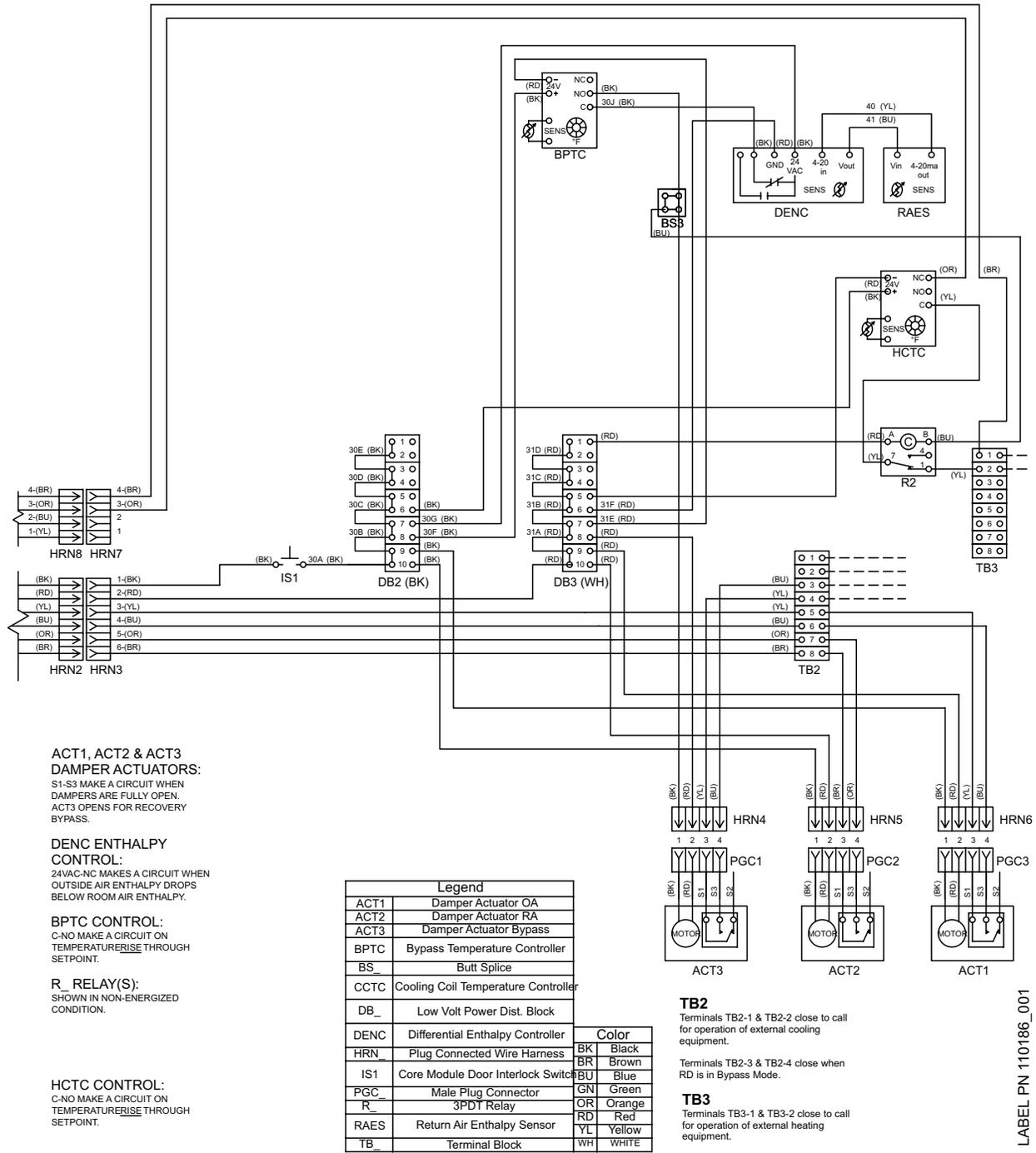
TB2
Terminals TB2-1 & TB2-2 close to call for operation of external cooling equipment.
Terminals TB2-3 & TB2-4 close when RD is in Bypass Mode.

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FIGURE 4-19. LOW VOLTAGE COMPARTMENT – HEATING UNITS.

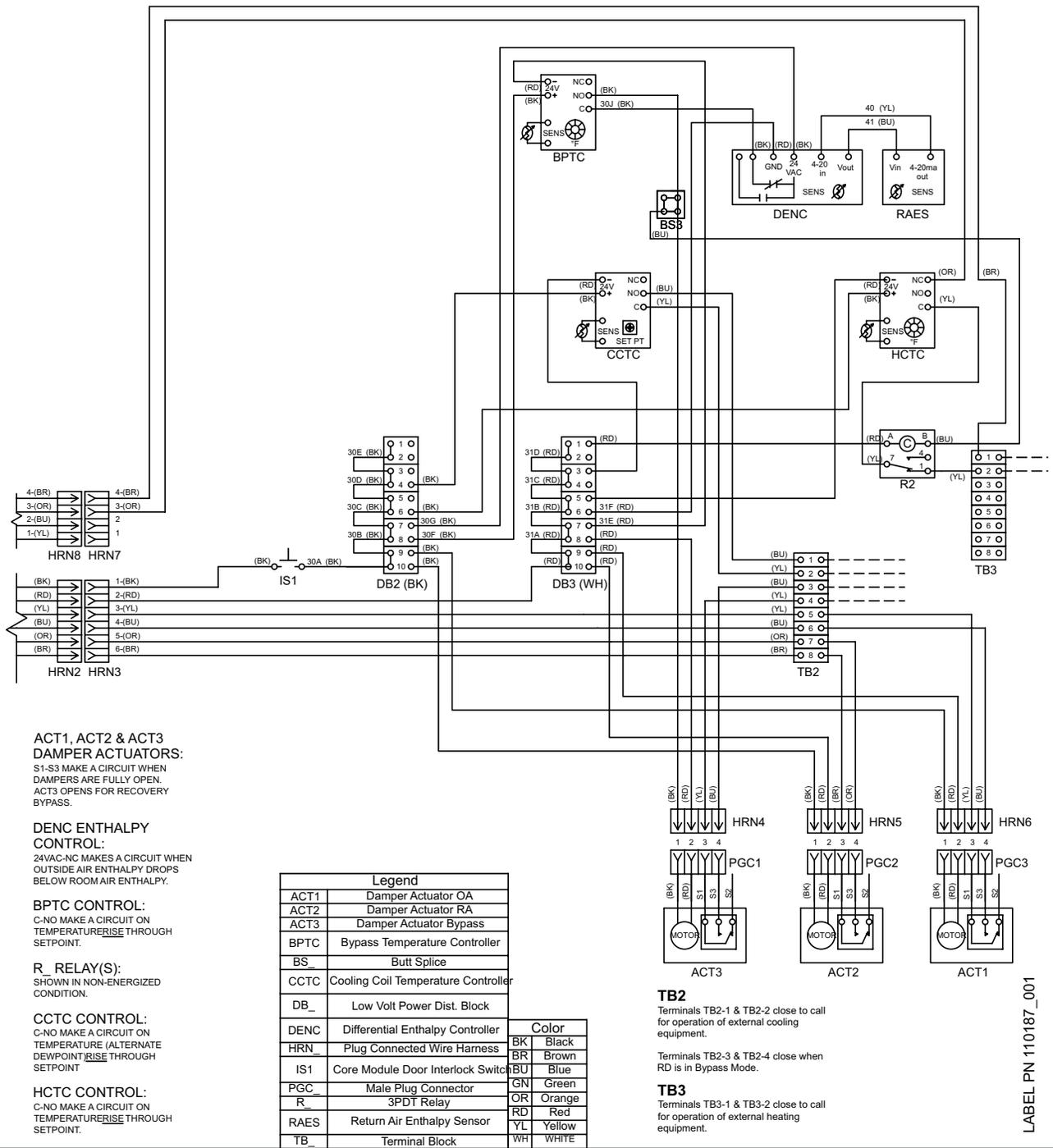
LOW VOLTAGE WIRING RD UNITS WITH HEAT COIL



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FIGURE 4-20. LOW VOLTAGE COMPARTMENT – DEHUMIDIFICATION & HEATING UNITS.

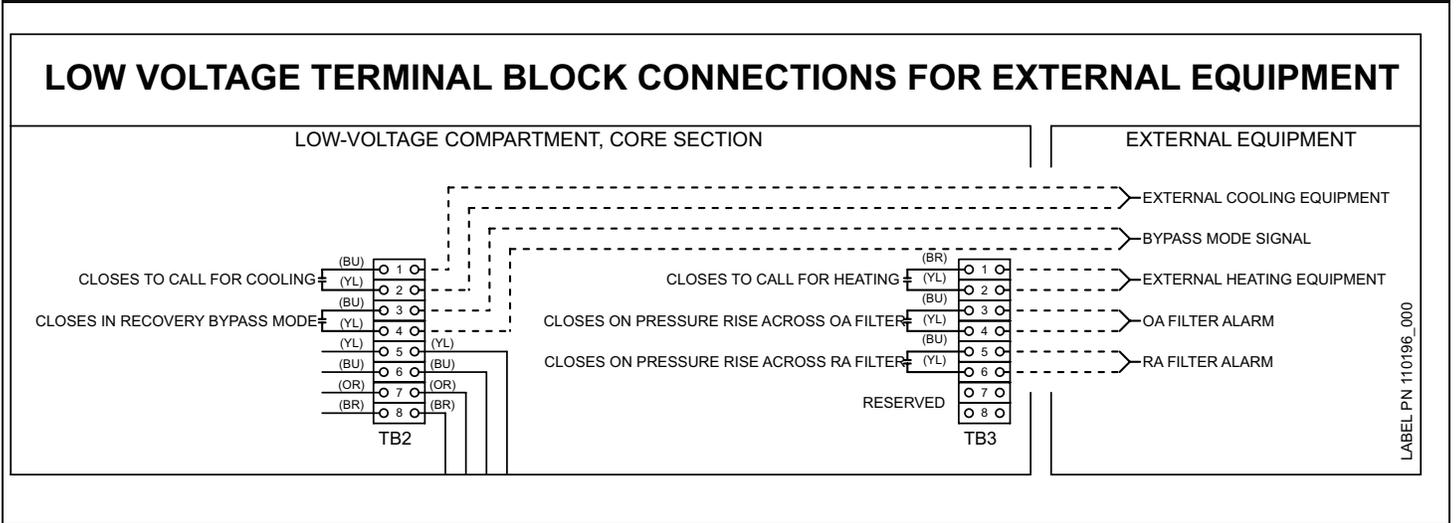
LOW VOLTAGE WIRING RD UNITS WITH HEAT AND DEHUMIDIFICATION COILS



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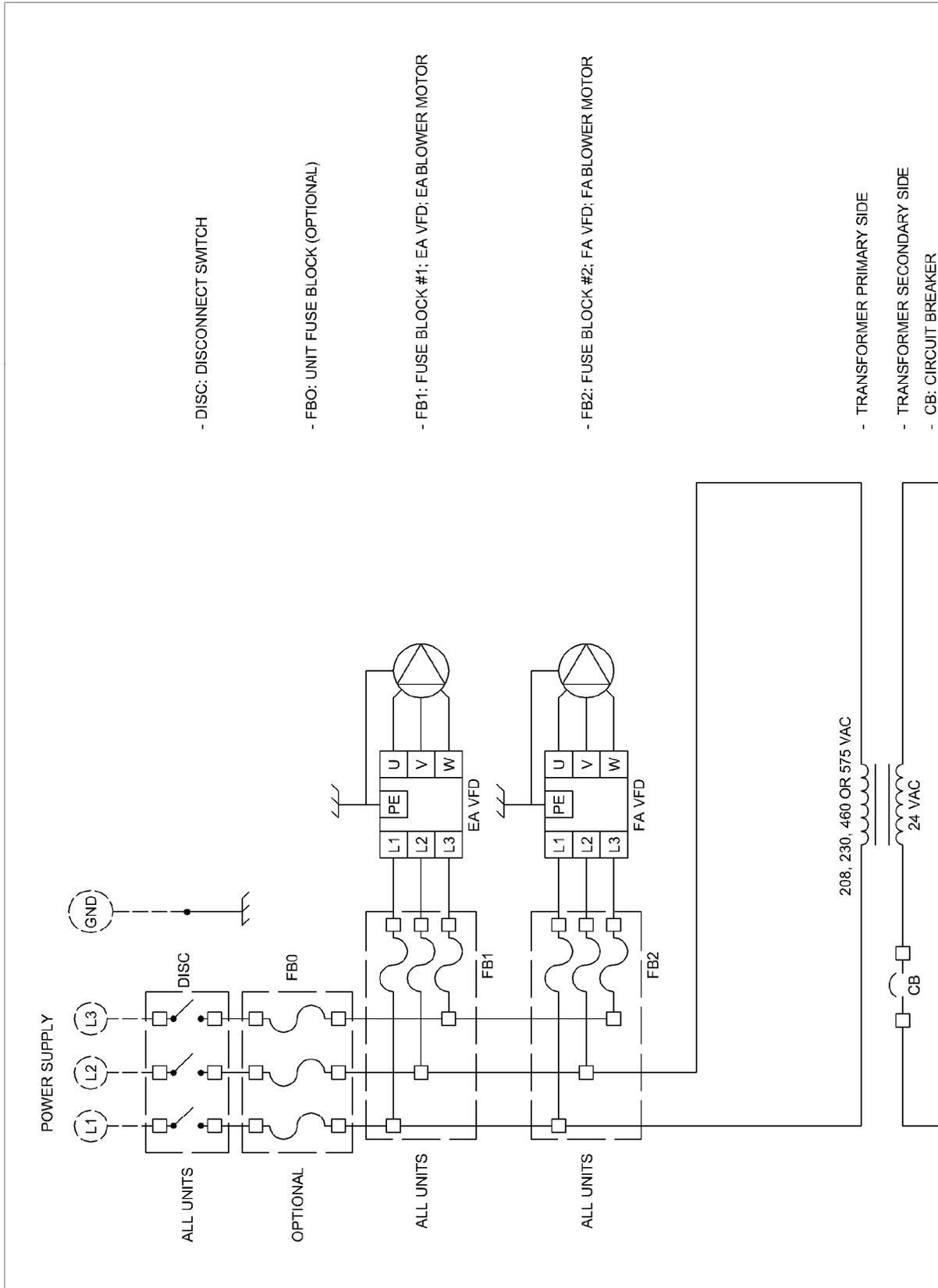
SCHEMATICS

FIGURE 4-21. LOW VOLTAGE COMPARTMENT – TERMINAL BLOCK CONNECTIONS FOR EXTERNAL EQUIPMENT.



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- DISC: DISCONNECT SWITCH

- FBO: UNIT FUSE BLOCK (OPTIONAL)

- FB1: FUSE BLOCK #1; EA VFD; EA BLOWER MOTOR

- FB2: FUSE BLOCK #2; FA VFD; FA BLOWER MOTOR

- TRANSFORMER PRIMARY SIDE

- TRANSFORMER SECONDARY SIDE

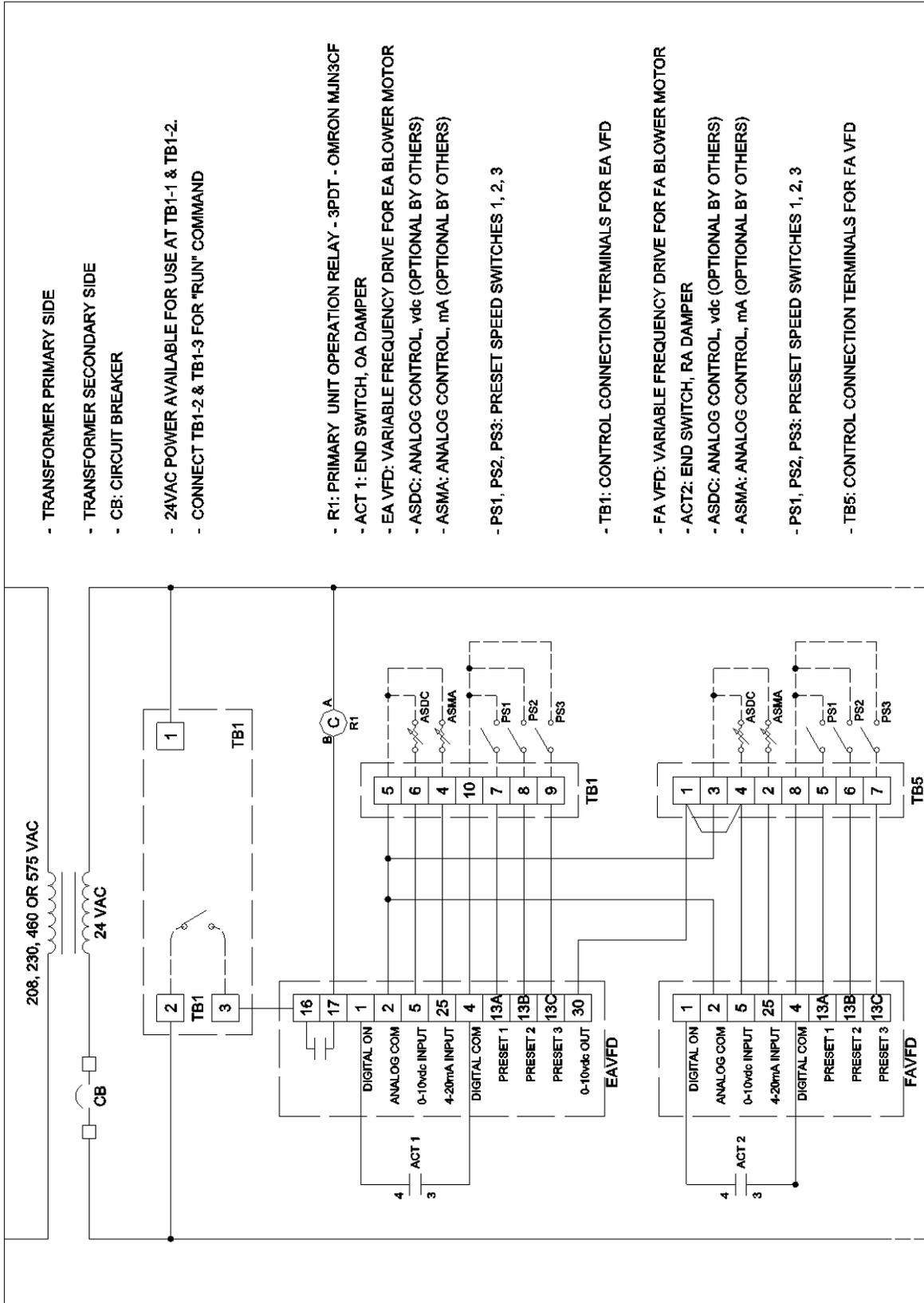
- CB: CIRCUIT BREAKER

FIGURE 4-22. HIGH VOLTAGE CIRCUITS (THREE-PHASE SHOWN)

Schematic continues in Figure 4-23.

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LADDER SCHEMATIC



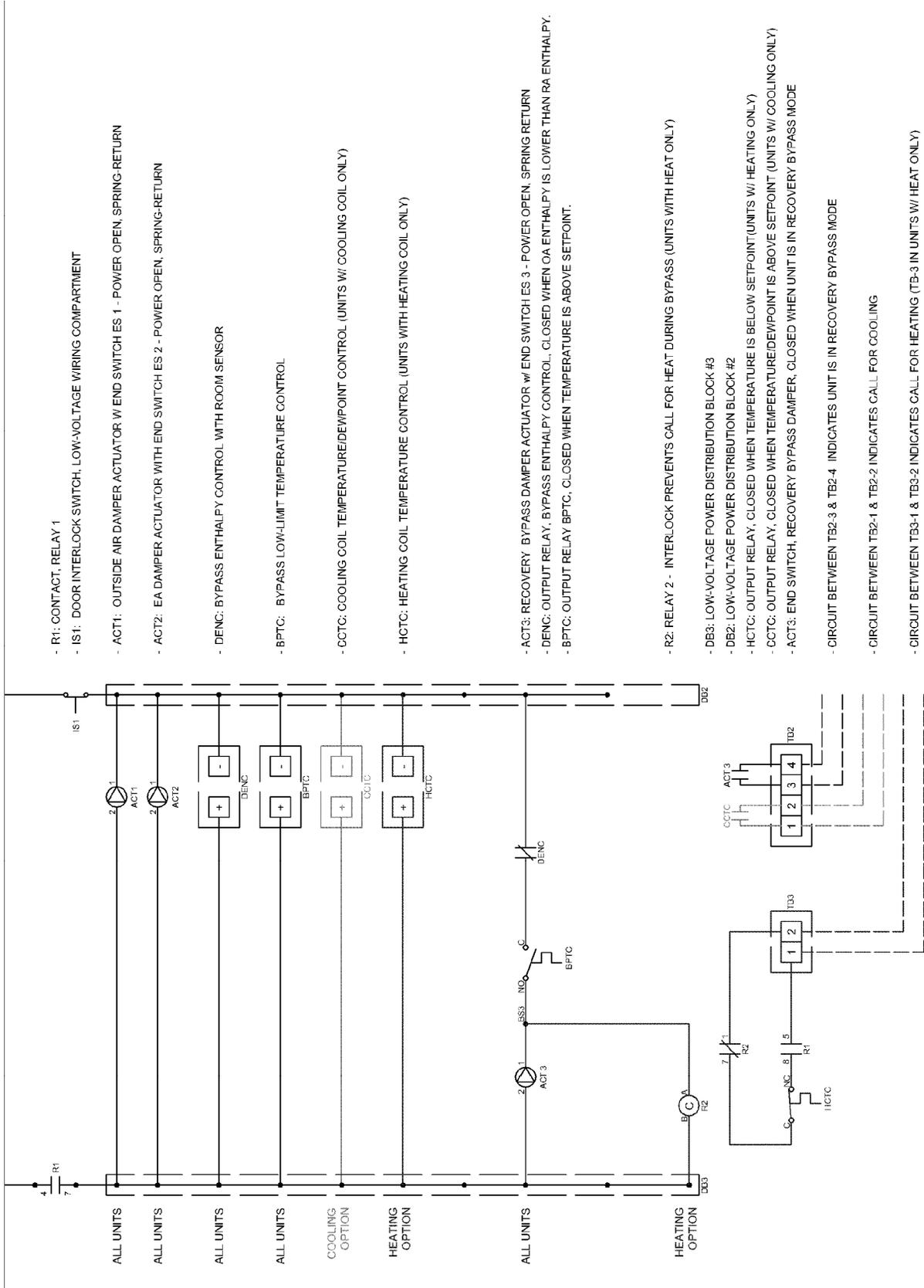
- TRANSFORMER PRIMARY SIDE
- TRANSFORMER SECONDARY SIDE
- CB: CIRCUIT BREAKER
- 24VAC POWER AVAILABLE FOR USE AT TB1-1 & TB1-2.
- CONNECT TB1-2 & TB1-3 FOR "RUIN" COMMAND
- R1: PRIMARY UNIT OPERATION RELAY - 3PDT - OMRON MJN3CF
- ACT 1: END SWITCH, OA DAMPER
- EA VFD: VARIABLE FREQUENCY DRIVE FOR EA BLOWER MOTOR
- ASDC: ANALOG CONTROL, vdc (OPTIONAL BY OTHERS)
- ASMA: ANALOG CONTROL, mA (OPTIONAL BY OTHERS)
- PS1, PS2, PS3: PRESET SPEED SWITCHES 1, 2, 3
- TB1: CONTROL CONNECTION TERMINALS FOR EA VFD
- FA VFD: VARIABLE FREQUENCY DRIVE FOR FA BLOWER MOTOR
- ACT2: END SWITCH, RA DAMPER
- ASDC: ANALOG CONTROL, vdc (OPTIONAL BY OTHERS)
- ASMA: ANALOG CONTROL, mA (OPTIONAL BY OTHERS)
- PS1, PS2, PS3: PRESET SPEED SWITCHES 1, 2, 3
- TB5: CONTROL CONNECTION TERMINALS FOR FA VFD

FIGURE 4-23. LOW VOLTAGE CIRCUITS (PART 1)

Schematic continues in Figure 4-24.

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- R1: CONTACT, RELAY 1
- IS1: DOOR INTERLOCK SWITCH, LOW-VOLTAGE WIRING COMPARTMENT
- ACT1: OUTSIDE AIR DAMPER ACTUATOR W/ END SWITCH ES 1 - POWER OPEN, SPRING-RETURN
- ACT2: EA DAMPER ACTUATOR WITH END SWITCH ES 2 - POWER OPEN, SPRING-RETURN
- DENG: BYPASS ENTHALPY CONTROL WITH ROOM SENSOR
- BPTC: BYPASS LOW-LIMIT TEMPERATURE CONTROL
- CCTC: COOLING COIL TEMPERATURE/DEWPOINT CONTROL (UNITS W/ COOLING COIL ONLY)
- HCTC: HEATING COIL TEMPERATURE CONTROL (UNITS WITH HEATING COIL ONLY)
- ACT3: RECOVERY BYPASS DAMPER ACTUATOR W/ END SWITCH ES 3 - POWER OPEN, SPRING RETURN
- DENG: OUTPUT RELAY, BYPASS ENTHALPY CONTROL, CLOSED WHEN OA ENTHALPY IS LOWER THAN RA ENTHALPY.
- BPTC: OUTPUT RELAY BPTC, CLOSED WHEN TEMPERATURE IS ABOVE SETPOINT.
- R2: RELAY 2 - INTERLOCK PREVENTS CALL FOR HEAT DURING BYPASS (UNITS WITH HEAT ONLY)
- DB3: LOW-VOLTAGE POWER DISTRIBUTION BLOCK #3
- DB2: LOW-VOLTAGE POWER DISTRIBUTION BLOCK #2
- HCTC: OUTPUT RELAY, CLOSED WHEN TEMPERATURE IS BELOW SETPOINT(UNITS W/ HEATING ONLY)
- CCTC: OUTPUT RELAY, CLOSED WHEN TEMPERATURE/DEWPOINT IS ABOVE SETPOINT (UNITS W/ COOLING ONLY)
- ACT3: END SWITCH, RECOVERY BYPASS DAMPER, CLOSED WHEN UNIT IS IN RECOVERY BYPASS MODE
- CIRCUIT BETWEEN TBS2-3 & TBS2-4 INDICATES UNIT IS IN RECOVERY BYPASS MODE
- CIRCUIT BETWEEN TBS2-1 & TBS2-2 INDICATES CALL FOR COOLING
- CIRCUIT BETWEEN TBS3-1 & TBS3-2 INDICATES CALL FOR HEATING (TBS-3 IN UNITS W/ HEAT ONLY)

FIGURE 4-24. LOW VOLTAGE CIRCUITS (PART 2)

End of Schematic.